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**CENTRAL FREEWAY NORTH-SOUTH
ACCESS STUDY**

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Prepared by:

**City and County of San Francisco
California Department of Transportation**

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June 1998

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EXECUTIVE SUMMARY

The Central Freeway North-South Access Study was mandated by Proposition H, which was approved by the voters of San Francisco in November 1997. The purpose of this study is to investigate the feasibility of restoring the north-south access to this freeway previously provided by the Franklin and Gough Street ramps. This study examines the need for and feasibility of providing improved north-south access in light of changes in traffic patterns which occurred in the study area since the October 1989 Loma Prieta earthquake, traffic improvements which have been implemented since 1989 and the feasibility and impacts, both negative and positive, of various north-south traffic improvement alternatives.

This report is divided into six chapters. CHAPTER 1 - INTRODUCTION provides background information on the Central Freeway. CHAPTER 2- GOALS AND EVALUATION CRITERIA provides a framework for evaluating north-south access alternatives. CHAPTER 3 - CONDITIONS WITH/WITHOUT FRANKLIN-GOUGH RAMPS describes how the closure of the Franklin-Gough ramps to the Central Freeway after the 1989 Loma Prieta earthquake redistributed north-south traffic in the study area. CHAPTER 4 - EXISTING CONDITIONS describes traffic conditions in the study area in 1996, before the closure of the Fell and Oak Street Central Freeway ramps, the conditions most similar to those expected once the Central Freeway is rebuilt as mandated by Proposition H. CHAPTER 5 - EVALUATION OF ALTERNATIVES describes and evaluates five north-south access alternatives, which are listed below:

<u>ALTERNATIVE NUMBER</u>	<u>ALTERNATIVE DESCRIPTION</u>
1.	Rebuild the Franklin-Gough Ramps
2.	New Northbound Off-Ramp to Fell Street at Octavia Street
3.	New Southbound On-Ramp From Octavia Street
4.	Operational Improvements to Laguna Street North of Fell Street
5.	Operational Improvements to Webster Street North of Oak Street

CHAPTER 6 - FINDINGS AND RECOMMENDATIONS summarizes the findings and the study recommendations. Findings of this study regarding traffic circulation changes between 1989 and the present include:

- The removal of the Franklin-Gough ramps following the 1989 Loma Prieta earthquake caused a shift in traffic to a variety of city streets. Traffic volume increases range from two percent to 67 percent on city streets influenced by this change;
- The traffic increases on Fell and Oak Streets west of Laguna Street after the closure of the Franklin-Gough ramps were 20 percent and 30 percent, respectively. These increases accounted for approximately 21 percent of the traffic that previously used the Franklin-

Gough ramps. The remaining 79 percent of the traffic that previously used the Franklin-Gough ramps was dispersed to a variety of city streets;

- Despite the closure of the Franklin-Gough ramps, traffic on northbound Franklin Street actually increased by eight percent following the earthquake, indicating that drivers wishing to use Franklin Street were willing to take any available route that would get them to this street despite surface street congestion; and
- A variety of traffic improvements made on city streets and on the freeway system prior to the 1996 closure of the Central Freeway has enhanced traffic flow along several alternative north-south routes.

Findings of this study regarding the feasibility of possible north-south access alternatives to the Central Freeway include:

- Spatial and topographical constraints in the vicinity of the current terminus of the Central Freeway hinder the feasibility of providing improved access from the freeway to the north and south;
- The single-deck construction of the Central Freeway to Oak and Fell Streets as required in Proposition H makes providing connections to north-south roadways more difficult than if the Central Freeway were a double-deck structure;
- Each traffic improvement alternative examined has a variety of both positive and negative impacts; and
- The most practical means of improving access from the Central Freeway to the northern parts of the city is by making small-scale traffic improvements to Laguna Street between Fell and Fulton Streets such as installing new traffic signals and creating exclusive turn lanes.

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CHAPTER 1

INTRODUCTION

The purpose of this study is to develop a plan to improve access between north-south city streets and the Central Freeway. The study was mandated by Proposition H, which was approved by the voters in November 1997. Proposition H also mandated that Caltrans strengthen and widen the lower deck of the Central Freeway to create a four-lane single-deck structure extending from Mission Street to Oak and Fell Streets. Therefore, all north-south alternatives described in this study are compatible with the rebuilding of the Central Freeway as a single-deck freeway between Mission Street and Oak and Fell Streets. A map of the Central Freeway study area is shown on Figure 1. A preliminary drawing of the Central Freeway with a single deck is shown on Figure 2. The text of Proposition H is shown in Appendix A of this report.

Previous Studies

Several studies of the Central Freeway have been performed since the 1989 Loma Prieta earthquake. These studies include:

- “101 Central Freeway in San Francisco between Mission/South Van Ness Ramps and Franklin/Gough Ramps” prepared by State of California, Department of Transportation; City and County of San Francisco; Federal Highway Administration; and Metropolitan Transportation Commission; August 28, 1991;
- “Central Freeway Alternative Approaches to Traffic Management” prepared by San Francisco Department of City Planning with the assistance of the San Francisco Department of Parking and Traffic, the Department of Public Works, and the California Department of Transportation, April 1992;
- “Congestion Relief Toll Tunnels” by Robert W. Poole and Yuzo Sugimoto, the Reason Foundation, July 1993;
- “Central Freeway Areawide Traffic Study” performed for the Department of Parking and Traffic by Wilbur Smith Associates, August 1994;
- “Central Freeway Areawide Traffic Study Phase II” performed for the Department of Parking and Traffic by Wilbur Smith Associates, November 1995; and
- “San Francisco Central Freeway Replacement Project Environmental Assessment /Finding of No Significant Impact (FONSI)” prepared by U.S. Department of Transportation Federal Highway Administration and State of California Department of Transportation, March 1998.

FIGURE 1

Central Freeway Study Area

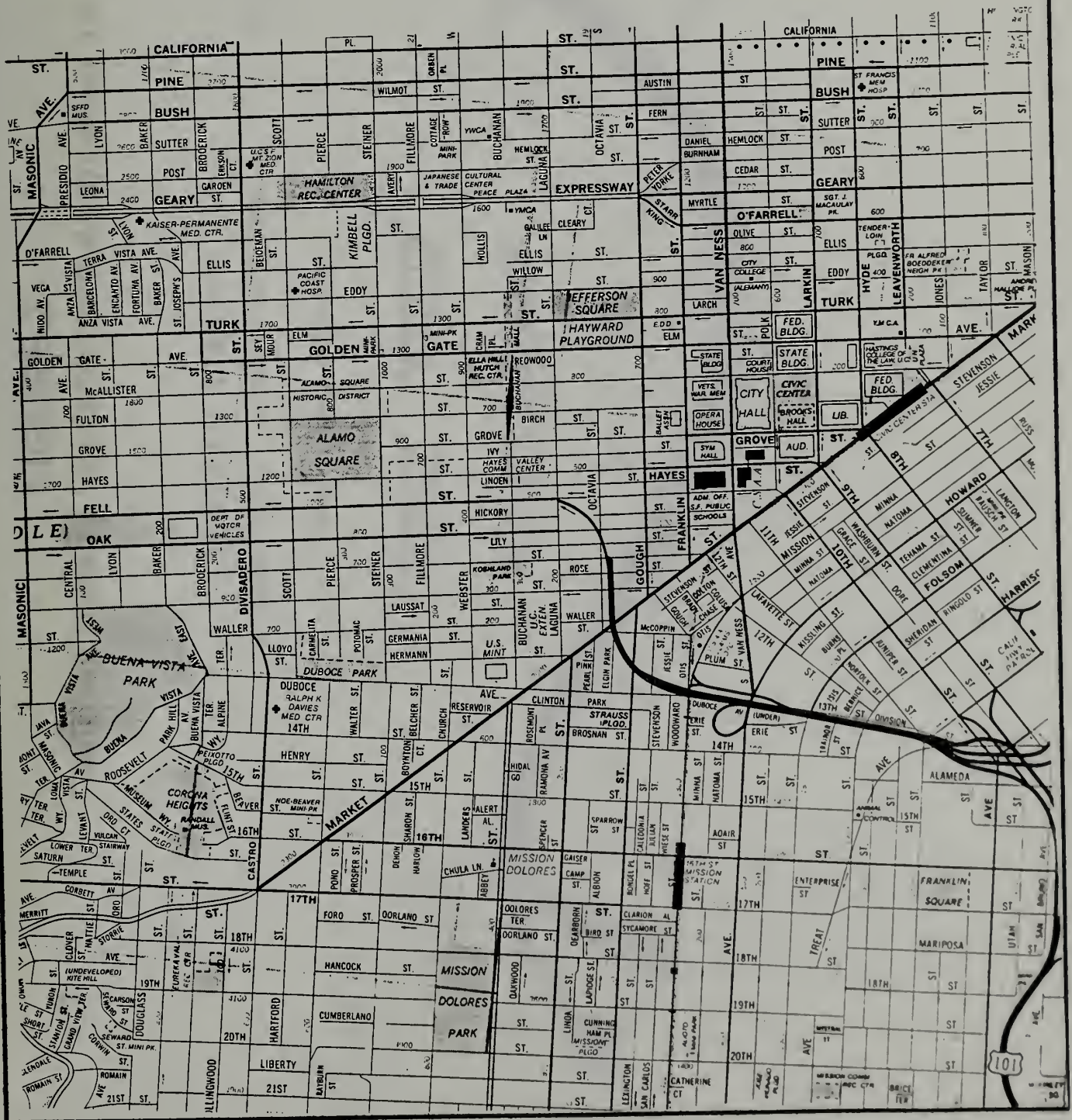
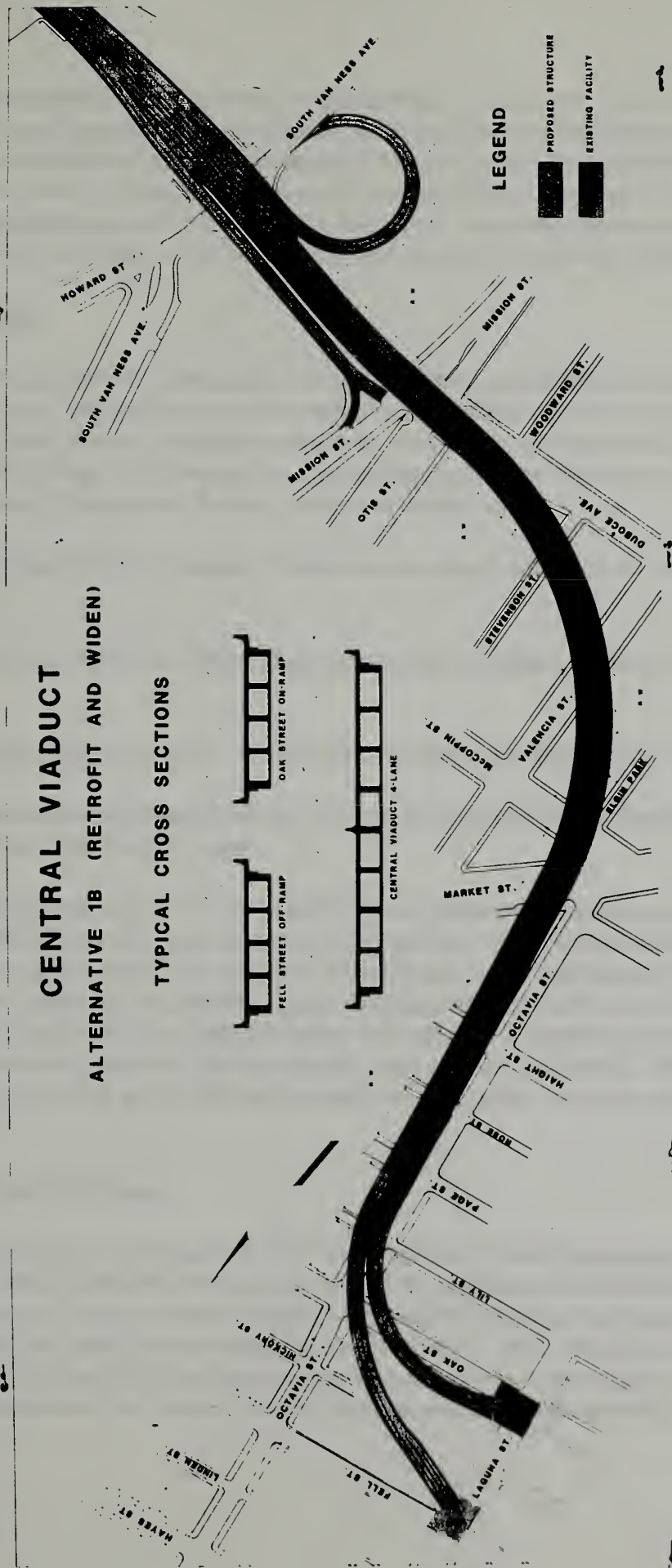


FIGURE 2
Central Freeway Replacement Alternative 1B



Each of the above studies describes alternative alignments for the Central Freeway, including removing the Central Freeway between Mission Street and Oak and Fell Streets, ending the freeway at Market Street and tunneling underneath Market Street. Because Proposition H mandates the rebuilding of a single-deck freeway between Mission Street and Oak and Fell Streets, these alternatives are not considered in this report. Readers interested in obtaining descriptions of these alternatives are referred to the previously mentioned studies.

Need for This Study

It is assumed that the authors of Proposition H included the requirement for this north-south access study as part of the ballot measure in response to concerns raised at Central Freeway public meetings about the lack of north-south access provided by the retrofitting of the Oak and Fell Street freeway ramps. For example, at a public hearing held by Caltrans on April 23, 1997 on the Central Freeway Replacement Project, public comments included:

“But we would like for Caltrans to find a way to give direct access to the north and south routes...”

“...if you look at all five of these plans, not one of these plans...routes traffic north/south,” and

“The diagram does not work. It does not move traffic north and south.”

Similarly, a written comment dated April 18, 1997 on the Central Freeway Replacement Project Environmental Assessment reads in part:

“...it is noted that the loss of the Central Freeway eliminated capacity to carry traffic north of Market and that this capacity needs to be restored. There should also be a statement to the effect that the demolition of the Franklin/Gough ramps concentrated all of the north-of-Market traffic on the Oak/Fell ramps, causing peak hour traffic volume on those streets to almost double until the Oak/Fell ramps were closed. A statement should be made that restoration of the north-of-Market capacity must be done in a manner which avoids concentration of all such traffic on Oak and Fell but, rather, allows for dispersion to other streets.”

History of the Central Freeway

The Central Freeway was constructed in 1959 as part of a city-wide freeway plan. It was constructed as a single-level steel structure between I-80 and Mission Street and as a double-deck reinforced concrete structure between Mission Street and the Fell-Oak and Franklin-Gough ramps. Following the Loma Prieta earthquake on October 17, 1989, the segment of the freeway between the Fell-Oak and Franklin-Gough ramps was closed due to severe structural damage. The remaining portions of the Central Freeway were braced to provide interim seismic support in

1990. In 1991, the legislature passed Senate Bill 181, which gave the City and County of San Francisco the authority to decide how or whether the Central Freeway would be rebuilt. The Franklin-Gough ramps were demolished in early 1992. Later in 1992, the Board of Supervisors passed Resolution 541-92 which made it the policy of the City of San Francisco not to build any new above-ground ramps north of Fell Street to replace the demolished section of freeway.

On August 25, 1996, Caltrans closed the Central Freeway in both directions between Mission Street and the Oak-Fell ramps in order to demolish the upper deck of the freeway. In October 1996, the City of San Francisco requested that the Fell Street ramp remain closed pending the selection of a project alternative after observing that traffic conditions did not worsen to the level anticipated and the initial success of measures undertaken to mitigate traffic impacts caused by the closure of the Central Freeway. Demolition of the upper deck was completed in November 1996. On April 12, 1997, the Fell Street ramp was reopened to carry westbound traffic only on the portion of the Central Freeway between Mission and Fell Streets in order to provide some traffic relief during the repaving of 19th Avenue. On July 29, 1997 the San Francisco Director of Elections certified that the initiative petition calling for Proposition H to be placed on the ballot had qualified for the ballot. In November 1997, Proposition H was approved by the voters of San Francisco. Finally, Board of Supervisors Resolution 1073-97 was approved on December 5, 1997. This resolution approved Caltrans Alternative 1B and urged Caltrans to proceed with its construction.

Study Team

This study was prepared by the City of San Francisco in cooperation with Caltrans. The study team consisted of the following agencies:

<u>Agency</u>	<u>Representative</u>
City and County of San Francisco	
San Francisco County Transportation Authority	Maria Lombardo
San Francisco Department of Parking and Traffic	Jerry Robbins
San Francisco Department of Public Works	Nelson Wong
San Francisco Planning Department	Peter Albert
California Department of Transportation (Caltrans)	Dennis Bosler Albert Yee

This report was written by Jerry Robbins and Peter Albert.

CHAPTER 2

GOALS AND EVALUATION CRITERIA

Choosing a preferred north-south Central Freeway alternative requires evaluating each alternative by various evaluation criteria which are based on the goals and objectives of the study. The Central Freeway Citizens' Advisory Task Force established a set of study goals and criteria as part of the Central Freeway Areawide Traffic Study Phase II. These previously-established goals and criteria, listed below, are considered appropriate for application to the Central Freeway North-South study as well, in order to maintain consistency between past and present planning processes.

Board of Supervisors' Central Freeway Citizens Advisory Task Force Goals and Criteria (June 1995):

GOAL: Select a preferred alternative of traffic and transit improvement for the Central Freeway corridor.

CRITERION 1: Minimize negative visual impacts:

- Apply good urban design principles;
- Recognize the importance of Market Street as a visual corridor, a major public transit corridor, and a grand boulevard, and advance the City's efforts to improve Market Street; and
- Preserve the historic character and structures of the affected neighborhood.

CRITERION 2: Promote neighborhood cohesion:

- No single neighborhood should bear the burden of freeway traffic;
- High-volume traffic should be routed around neighborhoods and onto traffic arteries; and
- Design should encourage traffic to move within legal speed limits.

CRITERION 3: Allow the maximum reclamation of freeway land for housing, open space, and neighborhood-serving commercial uses.

CRITERION 4: Allow for better management of all elements of the transportation system:

- Promote public transit operations and the City's Transit Preferential Streets Program;
- Facilitate pedestrian access to public transit; and
- Be compatible with both the existing public transit system and planned improvements.

CRITERION 5: Accommodate traffic circulation:

- Allow for better integration of the freeway system with the system of city streets;
- Offer better choices of freeway access/egress direction; and
- Minimize disruption during construction period.

CRITERION 6: Promote a healthy environment:

- Respect and improve the quality and integrity of public open spaces;
- Allow for safe neighborhood streets; and
- Promote improved air quality and reduction of noise impacts.

Proposition H Purpose and Intent

These Task Force goals and criteria were reviewed to determine if any modifications were required in light of the policy changes articulated in Proposition H. The text of Proposition H identified five statements of “purpose and intent” in justification of the endorsement of the retrofit and widening of the single-deck Central Freeway. The correspondence and consistency of the Task Force Goals and Criteria and Proposition H Purpose and Intent are described below.

The text of Proposition H includes the five following statements as the purpose and intent of the passage of the Central Freeway Replacement Project Act:

- a) To reopen the Central Freeway to eliminate the traffic congestion and pollution caused by its closure;
- b) To allow neighborhood residents the ability to enjoy the quality of life they experienced prior to the Loma Prieta Earthquake of 1989;
- c) To allow businesses and merchants the opportunity to serve the public without disruption;
- d) To give direction to the California Department of Transportation as to the alternative that has been approved by the City and County of San Francisco so that the Department of Transportation may proceed with the repair of the Central Freeway; and
- e) To place into law an ordinance which approves the most reasonable and practical alternative for the Central Freeway Replacement Project.

In addition to the purpose and intent of Proposition H, the proposition includes the following measures:

- Repeal of Board of Supervisors Resolution No. 541-92 prohibiting the construction of any elevated freeway structure north of Fell Street;
- Retrofit and widen the existing lower deck of the Central Freeway;
- Rebuild, rather than retrofit, the Oak and Fell Street ramps; and
- Study and resolve the lack of northern accessibility to the Central Freeway

corridor previously provided by the Franklin/Gough ramps (to be completed by July 1, 1998).

Correspondence Between Criteria and Proposition H Text

There are no fundamental inconsistencies between the Goals and Criteria established by the Central Freeway Citizens' Advisory Task Force and the Purpose and Intent of Proposition H. They are mutually inclusive and address a wide range of issues including traffic flow, livability and broader land use/economic concerns. However, the specific measures called for in Proposition H are not consistent with several of the Goals and Criteria, mostly regarding neighborhood cohesion, reclamation of freeway land and urban design.

CHAPTER 3

CONDITIONS WITH/WITHOUT FRANKLIN-GOUGH RAMPS

This chapter compares the traffic conditions which existed in the Central Freeway area prior to the October 17, 1989 Loma Prieta earthquake (which closed the Franklin and Gough ramps to the Central Freeway) with those that existed after the earthquake, but before the 1996 closure of the Oak and Fell Street ramps. Pre- and post-earthquake traffic conditions documented in the reports "Central Freeway Areawide Traffic Study" by Wilbur Smith Associates dated August 1994 and "Central Freeway Areawide Traffic Study Phase II" report dated November 1995 are summarized below.

Changes in Central Freeway Daily Traffic Volumes

With the removal of the Central Freeway segment north of Fell Street, much of the traffic that used to enter or exit the freeway at Franklin and Gough Streets shifted to other ramps and city streets. The change in traffic volumes on the three segments of the Central Freeway (I-80 to Mission Street, Mission Street to Fell-Oak Streets and Fell-Oak Streets to Franklin-Gough Streets) are shown on Table 1 below. The volume of traffic on the I-80 to Mission Street segment declined by 23,000 vehicles per day or 14 percent. The volume on the segment between Mission Street and Oak-Fell Streets declined by 49,000 vehicles per day or 34 percent, while the volume on the Oak-Fell to Franklin-Gough Streets segment declined by 82,000 vehicles per day or by 100 percent.

Table 1
CENTRAL FREEWAY TWO-WAY DAILY TRAFFIC VOLUMES
Pre- and Post-Earthquake

FREEWAY SEGMENT	PRE-QUAKE VOLUME	POST-QUAKE VOLUME	NET CHANGE	PERCENT CHANGE
I-80 to Mission Street	159,000	136,000	-23,000	-14%
Mission Street to Fell-Oak	143,000	94,000	-49,000	-34%
Oak/Fell to Franklin-Gough	82,000	0	-82,000	-100%

SOURCE: Central Freeway Areawide Traffic Study, August 1994, page 2-2.

The change in the volume of traffic using Central Freeway on- and off-ramps is shown on Table 2. As a result of the closure of the Franklin-Gough ramps, traffic volumes increased 4,000 vehicles per day or by 25 percent at the Mission Street off-ramp; by 8,000 vehicles per day or by 120 percent at the South Van Ness on-ramp, by 20,000 vehicles per day or by 74 percent at the Fell Street off-ramp, and by 13,000 vehicles per day or by 38 percent at the Oak Street on-ramp.

Table 2
CENTRAL FREEWAY ON- AND OFF-RAMP DAILY TRAFFIC VOLUMES
Pre- and Post-Earthquake

RAMP	PRE- QUAKE VOLUME	POST- QUAKE VOLUME	NET CHANGE	PERCENT CHANGE
Mission Street Off-Ramp	16,000	20,000	+4,000	+25%
South Van Ness On-Ramp	10,000	22,000	+12,000	+120%
Oak Street On-Ramp	27,000	47,000	+20,000	+74%
Fell Street Off-Ramp	34,000	47,000	+13,000	+38%

SOURCE: Central Freeway Areawide Traffic Study, August 1994, page 2-2.

Changes in City Street Daily Traffic Volumes

Table 3 shows the changes in traffic volumes on city streets before and after the Loma Prieta earthquake. Substantial increases in traffic volumes took place on 7th, 8th, 9th and 10th Streets in the South of Market area as a result of the closure of the Central and Embarcadero Freeways. Traffic volumes increased by 6,900 vehicles per day or 20 percent on Fell Street west of Laguna Street and by 10,500 vehicles per day or 30 percent on Oak Street west of Laguna Street. It should be noted that the percentage of traffic increase on Fell and Oak Streets west of Laguna Street was lower than the percentage of traffic increase on the Fell and Oak Street ramps shown on Table 2.

Traffic volumes on the Fell-Oak corridor west of Laguna Street increased by a total of 17,400 vehicles per day. This volume accounts for 21.2 percent of the 82,000 vehicles per day which were removed from the segment of the Central Freeway connecting to the Franklin-Gough Street ramps. Also, despite the closure of the Franklin Street Central Freeway off-ramp, traffic volumes increased by eight percent on northbound Franklin Street at California Street, indicating that northbound traffic was willing to use whatever routes were available to reach this street. Unfortunately, no pre-earthquake counts on Gough Street north of the Gough Street on-ramp were available to determine the closure of the on-ramp's impact on Gough Street traffic volumes. Figure 3 shows the city streets in the vicinity of the Central Freeway that experienced increased traffic volumes as a result of the 1989 earthquake.

FIGURE 3

Increased Traffic Volumes Since the 1989 Loma Prieta Earthquake

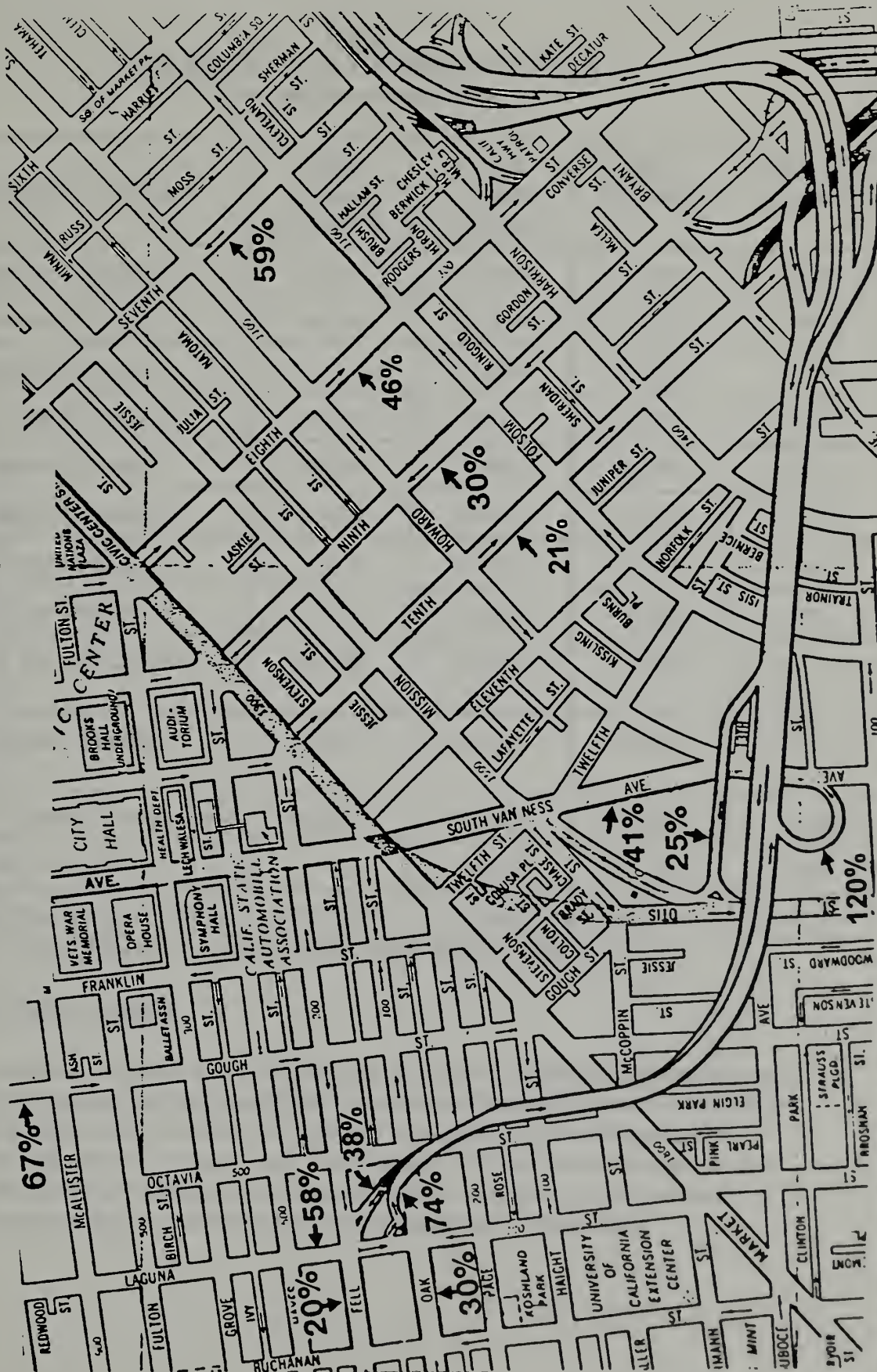


Table 3
CITY STREET DAILY TRAFFIC VOLUMES
Pre- and Post-Earthquake

CITY STREET LOCATION	PRE- QUAKE VOLUME	POST- QUAKE VOLUME	NET CHANGE	PERCENT CHANGE
7th St. south of Howard	11,000	17,500	+6,500	+59%
8th St. south of Howard	14,700	21,400	+6,700	+46%
9th St. south of Howard	26,100	33,900	+7,800	+30%
10th St. south of Howard	18,200	22,100	+3,900	+21%
Fell St. west of Laguna	34,500	41,400	+6,900	+20%
Fell St. east of Divisadero	33,800	38,000	+4,200	+12%
Oak St. west of Laguna	35,000	45,500	+10,500	+30%
Franklin St. at California	28,700	31,300	+2,600	+8%
Gough St. south of Golden Gate	16,600	27,900	+11,300	+67%
South Van Ness south of Howard	19,100	26,900	+7,800	+41%
19th Ave. south of Lincoln Way	68,000	79,000	+11,000	+16%
Laguna St. north of Fell	5,700	9,000	+3,300	+58%
Van Ness Ave. north of Turk	79,000	81,000	+2,000	+2%

SOURCE: Central Freeway Areawide Traffic Study, August 1994, page 2-6.

Area Daily Traffic Volumes

Table 4 provides a comparison of traffic and transit volumes between the pre-earthquake (October 1989) period and the period after demolition of the freeway north of Fell Street (1994). The table shows a total 123,000 vehicle reduction in traffic volumes on the Central and Embarcadero Freeways and a very similar 123,400 vehicle increase on city streets. This table indicates a shift in automobile traffic away from the Central and Embarcadero Freeways to South of Market local streets and 19th Avenue.

Table 4
AREAWIDE DAILY TRAFFIC VOLUME IMPACTS
Pre- and Post-Earthquake

STREET	PRE-QUAKE VOLUME	POST-QUAKE VOLUME	CHANGE
South of Market Local Streets	221,300	313,700	+112,400
19th Avenue	68,000	79,000	+11,000
Net Increase			+123,400
Embarcadero Freeway	101,000	0	-101,000
Central Freeway	159,000	136,000	-22,000
Net Decrease			-123,000

SOURCE: Central Freeway Areawide Traffic Study, August 1994, page 2-3.

Transit Patronage

The Bay Area Rapid Transit (BART) reported a significant increase in transit patronage following the 1989 earthquake. BART patronage increased from 55,000 riders per day to 65,000 riders per day on the West Bay line, and from 100,000 riders to 120,000 riders per day on Transbay operations. The Loma Prieta earthquake did not have an obvious impact on overall Municipal Railway patronage.

Summary

The closure of the Franklin-Gough ramps to the Central Freeway, along with the closure of the Embarcadero Freeway, caused a redistribution of traffic from the freeways to the city street system. Approximately 21 percent of the traffic that had used the Franklin-Gough ramps prior to the earthquake shifted to Fell and Oak Streets west of Laguna Street, creating traffic increases of 20 percent on Fell Street west of Laguna Street and 30 percent on Oak Street west of Laguna Street. The remaining 79 percent of this traffic shifted to a variety of city streets, including 7th, 8th, 9th and 10th Streets and 19th Avenue. Even with the removal of the Franklin-Gough ramps, there was an eight percent increase in the volume of northbound traffic on Franklin Street at California Street.

CHAPTER 4 EXISTING CONDITIONS

An accurate understanding of existing transportation conditions on the Central Freeway, its ramps and on the surface streets near the ramps is critical to understanding the implications associated with changes to the freeway. Proposition H calls for the retrofitting and widening of the lower deck of the Central Freeway and returning the Fell-Oak ramps to the condition that existed prior to the closure of the freeway in August 1996. Therefore, the traffic conditions that existed prior to the 1996 closure are the most relevant in assessing the potential for providing for improved north-south freeway access once the Central Freeway has been rebuilt to Fell and Oak Streets. The following discussion of existing conditions is taken largely from the "Central Freeway Areawide Traffic Study" by Wilbur Smith Associates dated August 1994 and the "Central Freeway Areawide Traffic Study Phase II" report dated November 1995, also by Wilbur Smith Associates.

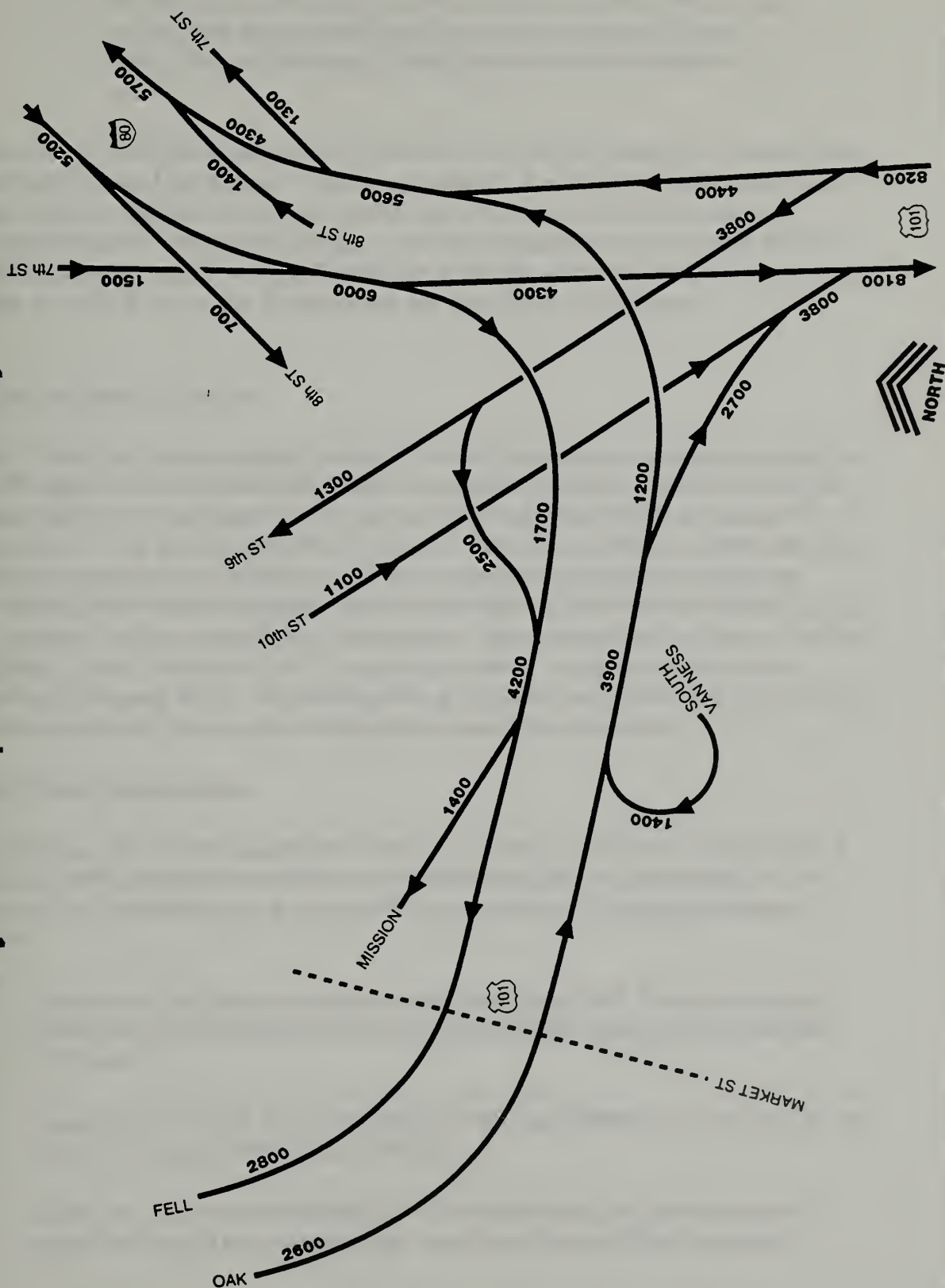
Freeway and Ramp Traffic Volumes

Traffic volumes vary by hour of the day and day of the week on the Central Freeway. In order to describe hourly and daily variations and to identify the PM peak traffic hour, machine traffic counts were conducted in 1995 at all Central Freeway ramps for an entire week along with a review of Caltrans mainline freeway counts.

Figure 4 describes the average weekday PM peak hour traffic volumes on the Central Freeway and its ramps. The PM peak hour traffic volumes represent the highest 60-minute count during the three-hour PM peak hour commute period (3 to 6 PM) on a Tuesday, Wednesday or Thursday. Key features shown in Figure 1 include:

- A total of 5,400 (2,800 + 2,600) vehicles per hour (vph) crossing above Market Street to/from the Fell-Oak Street ramps;
- A total of 8,100 (4,200 + 3,900) vph on the Central Freeway east (south) of the South Van Ness Avenue ramp;
- A pronounced orientation of Central Freeway traffic towards US-101 South 5,200 (2,500 + 2,700) vph (64 percent) versus towards the Bay Bridge 2,900 (1,700 + 1,200) vph (36 percent);
- The Mission Street and Fell Street off-ramps serve a total of 4,200 vph of freeway exit traffic and the Ninth, Eighth and Seventh Street off-ramps serve a total of 3,300 vph during the PM peak hour; and

FIGURE 4



- The Oak Street and South Van Ness Avenue on-ramps serve a total of 4,000 vph during the PM peak hour and on-ramps at Tenth Street, Harrison Street and Bryant Street serve an additional 4,000 vph.

Observation of traffic flow indicates that volume on the Central Freeway is reduced when traffic on the James Lick Freeway or I-80 is congested. For example, traffic backups due to Bay Bridge congestion sometimes impede traffic northbound on the James Lick Freeway destined for the Central Freeway. Similarly, congestion at the Central Freeway southbound merge onto the Central Freeway or at Hospital Curve sometimes impedes the volume of traffic from the Bay Bridge which can enter the Central Freeway.

Intersection Levels of Service

Table 5 shows the volume/capacity ratios for Central Freeway area intersections prior to the 1996 closure of the Fell and Oak Street ramps, and is therefore representative of the situation that would exist after the Oak and Fell Street ramps as rebuilt as required by Proposition H. The analysis used the Circular 212 Planning method to calculate the ratio of volume-to-capacity (V/C) ratios for the major intersections within the study area. Intersections with volume-to-capacity ratios of less than 0.9 are at level-of-service (LOS) A-D, generally indicating satisfactory performance. Intersections having a level-of-service ratio from 0.9 to 1.0 are rated LOS E, operating at close to maximum capacity and experiencing frequent delay. Intersections with a V/C ratio greater than 1.0 are at LOS F, indicating significant delay on all or most approaches to the intersection.

Recent Traffic Improvements

In some cases, the volume/capacity ratios shown on Table 5 have been reduced due to a number of traffic improvements which were implemented either in preparation for the closure of the Central Freeway in August 1996 or since then. These improvements include:

1. Franklin and Oak Streets intersection and Franklin and Fell Streets intersection: Established tow-away lane on the east side of Franklin Street between Oak and Fell Streets;
2. Gough Street, Market Street and Haight Street: Established tow-away lane on the east side of Gough Street north of Market;
3. South Van Ness Avenue/Howard Street: Rechannelized this intersection and prohibited through movements on the westbound Howard Street approach;

4. Fell Street, Market Street, Polk Street and 10th Street: Rechannelized this intersection to provide an additional lane on Fell Street and established a tow-away lane on the east side of 10th Street south of Market Street;
5. North Seventh and McAllister Streets: New traffic signal;
6. Fulton and Larkin Streets: New traffic signal;
7. Hayes and Franklin Streets: Established tow-away lane on north side of Hayes Street between Van Ness Avenue and Franklin Streets;
8. Mission Street and the 101 off-ramp: Prohibited right turns from westbound 13th Street onto Mission Street;
9. Van Ness Avenue and Hayes Street: Added a second northbound left turn lane from Van Ness Avenue onto Hayes Street, established a tow-away lane on the east side of Van Ness Avenue between Fell and Hayes Streets and a tow-away lane on the north side of Hayes Street between Polk Street and Van Ness Avenue 4-7 PM;
10. Hayes Street between Larkin and Polk Streets: Closed the north sidewalk to provide a truck loading dock parallel to the curb at the rear of the Bill Graham Civic Auditorium so that delivery vehicles would no block traffic on Hayes Street;
11. Mission Street and South Van Ness Avenue: Rechannelized the southbound South Van Ness Avenue approach to provide an exclusive left turn lane for Municipal Railway buses;
12. 9th, 10th, Hayes and Fell Streets: Retimed traffic signals to provide additional green time to these streets;
13. 6th Street, Brannan to Market Streets: Established a tow-away lane on the east side of 6th Street between 7-9 AM and 4-7 PM;
14. Market and Franklin Streets: Established a tow-away lane on the west side of Franklin Street between Market and Fulton Streets, 7-9 AM;
15. Mission Street and South Van Ness Avenue: Established a tow-away lane on the south side of Mission Street between Duboce and South Van Ness Avenues;
16. 10th Street: Established a tow-away lane on the east side from Howard to Bryant Streets, 7-9 AM and 4-6 PM; and

17. South Van Ness Avenue Loop On-Ramp to Central Freeway: Widened and restriped this on-ramp from one to two lanes.

All of these improvements have contributed to improved north-south traffic through the study area.

Additional Traffic Improvements

In order to reduce the traffic impacts of increased traffic on Fell and Oak Streets, the Department of Parking and Traffic is exploring the feasibility of retiming the signals on these streets for slower speeds during evening and weekend periods. This change would reduce the negative traffic impacts on Fell and Oak Streets without increasing traffic on any other streets or reducing peak period capacity. This approach may be just as effective in reducing the environmental impacts of off-peak traffic on Fell and Oak Streets as roadway improvements designed to reroute this traffic to other streets.

Table 5
PRE-1996 INTERSECTION VOLUME-TO-CAPACITY RATIOS

INTERSECTION	AM V/C RATIO	PM V/C RATIO
Franklin/Pine	0.73	0.86
Franklin/Bush	0.69	0.70
Franklin/Geary	0.51	0.73
Franklin/O'Farrell	0.56	0.63
Franklin/Turk	0.42	0.59
Franklin/Golden Gate	0.50	0.51
Franklin/Fell	0.84	0.63
Franklin/Oak	0.74	0.32
Franklin/Page/Market	0.82	0.82
Gough/Pine	0.49	0.69
Gough/Bush	0.86	0.70
Gough/Geary	0.77	0.75
Gough/Turk	0.66	0.71
Gough/Golden Gate	0.74	0.65
Gough/Fell	0.50	0.67
Gough/Oak	0.59	0.63
Gough/Market/Haight	0.92	1.18
Laguna/Fell	0.91	0.91
Laguna/Oak	1.03	0.79
Octavia/Fell	N/A	0.68
Octavia/Oak	N/A	0.54
Octavia/Page	N/A	0.42
Octavia/Haight	N/A	0.39
Octavia/Market	N/A	0.89

Van Ness/Pine	0.94	0.86
Van Ness/Bush	0.86	0.90
Van Ness/Geary	0.87	0.84
Van Ness/O'Farrell	0.81	0.90
Van Ness/Turk	0.86	0.87
Van Ness/Golden Gate	0.78	0.84
Van Ness/McAllister	0.78	0.90
Van Ness/Grove	0.78	0.84
Van Ness/Hayes	0.82	0.84
Van Ness/Fell	0.86	0.91
Van Ness/Market	0.75	0.84
Market/10th	0.47	0.57
Market/9th	0.57	0.74
Mission/S. Van Ness	0.72	0.84
Mission/NB 101 Off-Ramp	0.92	0.97
S. Van Ness/Howard	0.85	0.93
S. Van Ness/Duboce/13th	0.77	0.87
Harrison/10th	N/A	0.63
Harrison/9th	N/A	0.68
Harrison/8th	0.54	0.71
Harrison/7th	N/A	0.99
Bryant/10th	0.50	0.59
Bryant/9th	0.51	0.71
Bryant/8th	N/A	0.60
Bryant/7th	N/A	0.56

SOURCE: Central Freeway Areawide Traffic Study, August 1994, pages 2-13 thru 2-16.

CHAPTER 5

EVALUATION OF ALTERNATIVES

A variety of Central Freeway north-south access alternatives are evaluated in this study, ranging from rebuilding the Franklin-Gough Central Freeway ramps to their pre-1989 condition to making minor traffic operational changes to north-south city streets such as Laguna and Webster Streets. The alternatives evaluated in the study are described briefly below. Each alternative is evaluated in the following section.

These alternatives were selected by the study team based on the following criteria: they provide improved traffic access between the Central Freeway and areas to the north, they are compatible with the Central Freeway rebuilding plan mandated by the voters and they do not require the acquisition of additional roadway right of way. Some of these alternatives have been reviewed in previous Central Freeway alternative studies.

The selection of alternatives was unconstrained by funding considerations. The alternatives considered represent a wide range of project costs. Since no funds have been identified or designated for the implementation of any of these alternatives, project cost is a very important factor in the evaluation of any these alternatives.

Another important consideration described for each alternative is the feasibility of fitting additional freeway ramps into the constrained sites and topography along the Central Freeway right of way. Since the north-south city streets are only about 300 feet apart, a freeway on- or off-ramp would have to either be very steep or block off one or more east-west streets unless there is a significant difference in the elevation between the two east-west streets. The previous Franklin and Gough Street ramps were able to terminate at Golden Gate Avenue and Turk Street respectively, while providing adequate clearance above the street to the south of the ramp terminal because the elevation of Turk Street at Gough Street is fifteen feet higher than the elevation of Golden Gate Avenue, and Golden Gate Avenue is thirteen feet higher than McAllister Street. Because the terrain is almost level along Octavia Street between Page and Hayes Streets, it is very difficult to design on- and off-ramps that meet the minimum acceptable standards in this vicinity that do not prevent east-west traffic flow on an adjacent city street.

North-South Alternatives Evaluated

The five alternatives evaluated in this report are described briefly below. They represent the full range of possible north-south alternatives ranging from rebuilding the Franklin-Gough ramps to making minor modifications to existing city streets near existing on- and off-ramps.

Alternative 1: Rebuild Franklin-Gough Ramps - This alternative, shown on Figure 5, would rebuild the Franklin-Gough ramps between the Central Freeway and the intersections of Franklin Street/Golden Gate Avenue in the northbound direction and Gough/Turk Streets for southbound traffic. The alteration of the former double-deck section of the Central Freeway to a single deck freeway as mandated by Proposition H will make this alternative difficult to construct. While the connection of the northbound Central Freeway to a new ramp leading to Franklin Street could be built fairly simply, a new southbound ramp from Gough Street would need to pass over the northbound freeway leading to Fell Street in order to connect to the southbound portion of the freeway coming from Oak Street.

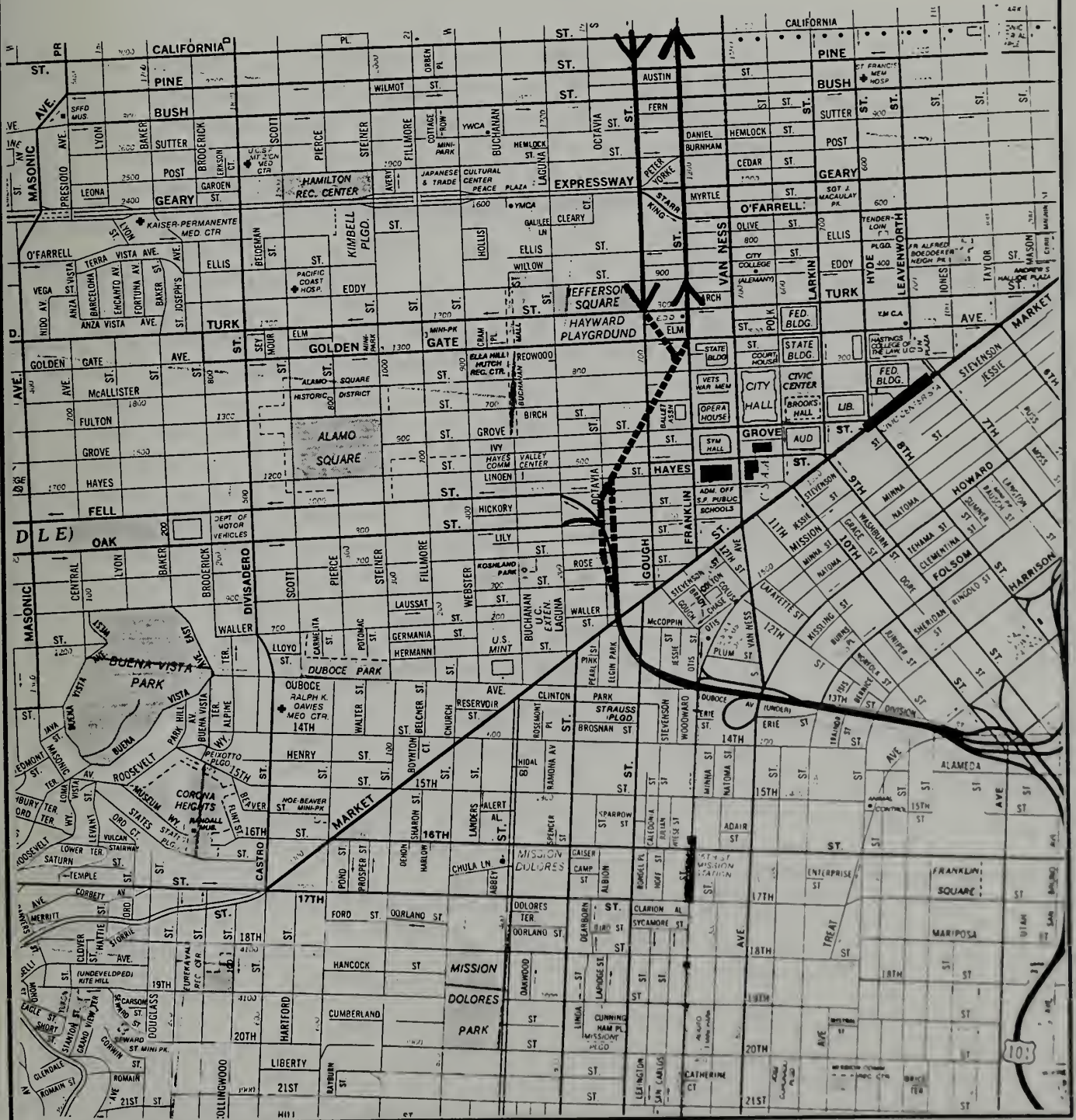
Alternative 2: New Northbound Off-Ramp to Fell Street at Octavia Street - Access from the Central Freeway to the north could be improved by constructing a new off-ramp on the east side of the Fell Street ramp onto eastbound Fell Street or to northbound Octavia Street. As shown on Figure 6, this ramp would connect to the east side of the Fell Street ramp and drop down to Fell Street at Octavia Street. The block of Fell Street between Gough and Octavia Streets would be made two-way (it is currently one-way westbound) to accommodate eastbound traffic between the off-ramp and Franklin Street. Alternatively, off-ramp traffic could use northbound Octavia Street to reach eastbound Fulton Street and northbound Franklin Street. This off-ramp would be fairly steep because it would have to pass over Oak Street and drop down approximately eighteen feet in elevation between the north curb of Oak Street and the south curb of Fell Street, a distance of only about 300 feet. Hickory Street would have to be closed off at the freeway structure, so this street would no longer go through to Octavia Street.

Alternative 3: New Southbound On-Ramp From Octavia Street - In order to eliminate the need for southbound traffic to pass through the Fell/Octavia intersection in order to reach the Oak Street on-ramp, a new connection could be provided from Octavia Street to the Oak/Laguna intersection which passes under the Fell Street off-ramp, as shown on Figure 7. This alternative would require changing the operation of Oak Street between Octavia and Gough Streets from one-way eastbound to two-way. A variation of this alternative is shown on Figure 8 which provides a continuation of Hickory Street between Octavia and Laguna Streets. Under this proposal, traffic on southbound Gough Street destined for the Oak Street on-ramp could turn right on Fell Street, go west for one block to Octavia Street and turn left, then use the new street to reach the Oak Street on-ramp at the Oak/Laguna intersection. Under both of these proposals, the left turn movement from westbound Fell Street onto southbound Laguna Street would be prohibited. These two variations could be combined to provide access to the new roadway from either Fell or Oak Street.

Alternative 4: Operational Improvements to Laguna Street North of Fell Street - This alternative would improve traffic operations on northbound Laguna Street between Fell and Fulton Streets in order to improve access from the Fell Street off-ramp to the

FIGURE 5

Alternative 1: Rebuild Franklin-Gough Ramps



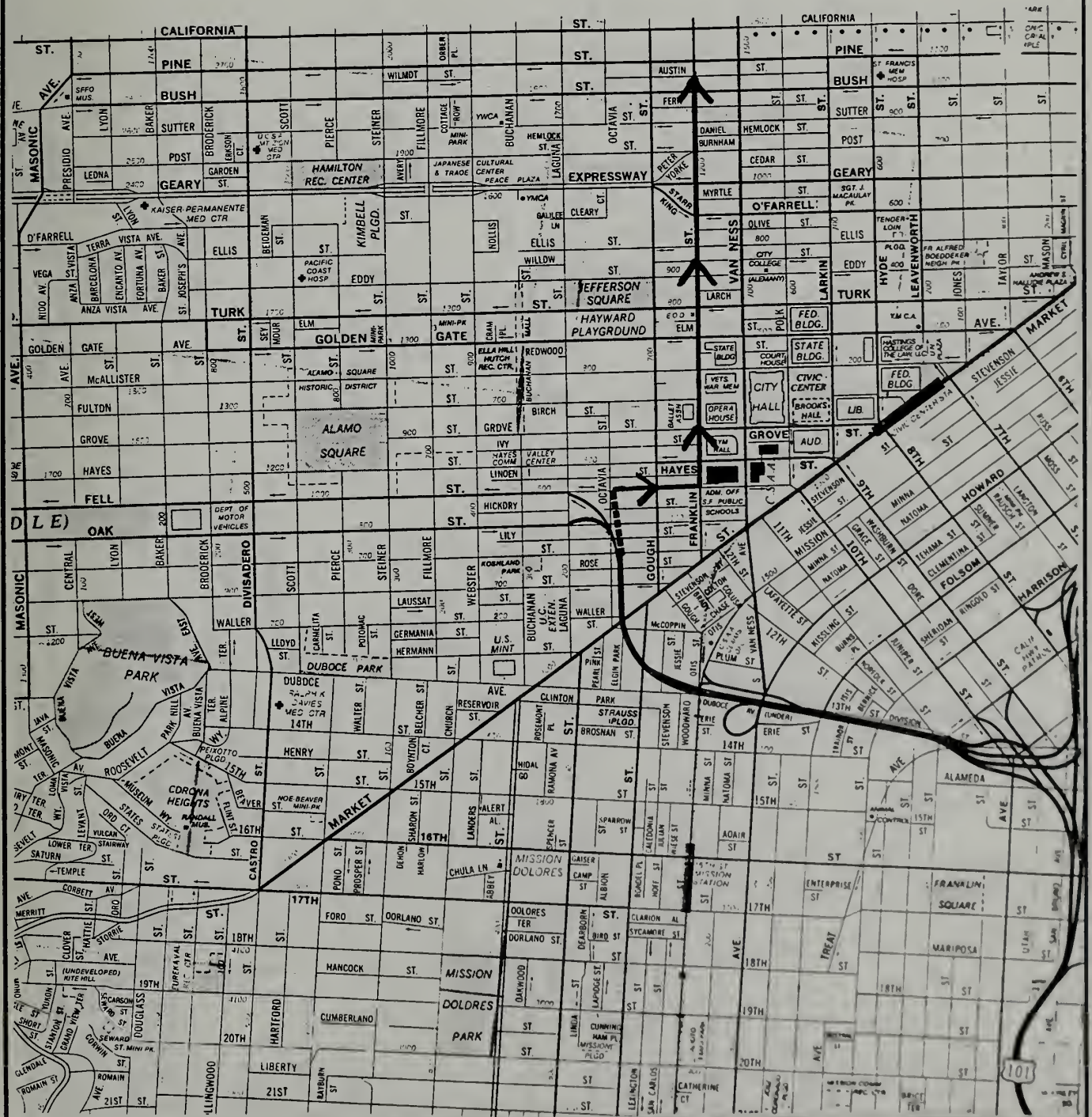


FIGURE 7

Alternative 3A: New On-Ramp from Oak/Octavia

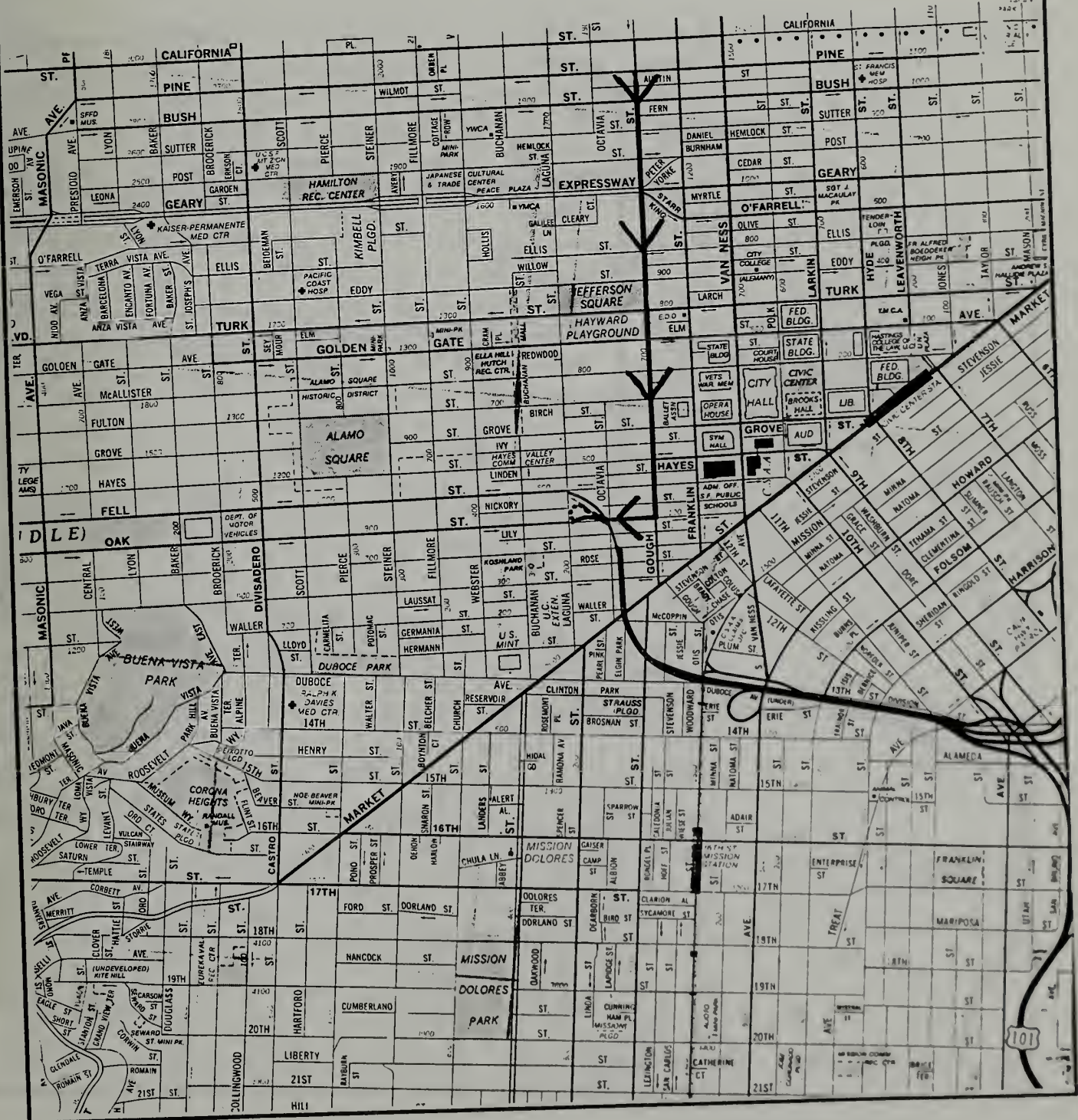
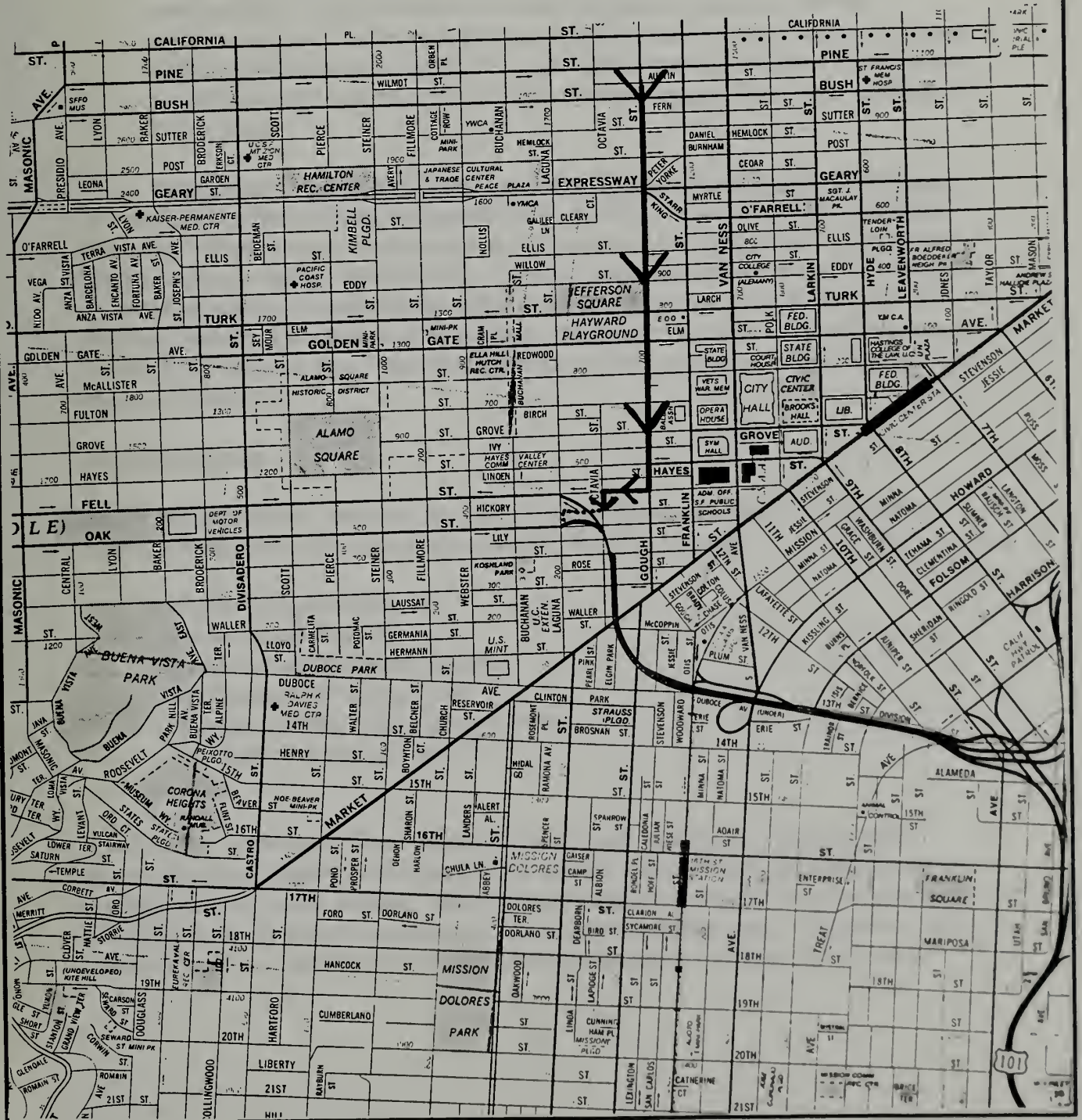


FIGURE 8

Alternative 3B: New On-Ramp from Fell/Octavia



north. Laguna Street currently has one lane of northbound traffic north of the Fell Street off-ramp, with four way STOP controlled intersections at Laguna/Hayes and Laguna/Grove. In order to improve access from the Fell Street off-ramp to northbound Franklin Street, the following operational improvements could be made, as shown on Figure 9:

- Signalize the intersections of Laguna/Hayes and Laguna/Grove; and
- Provide an additional northbound lane on Laguna Street by narrowing the sidewalks from fifteen feet on each side of the street to nine feet, removing the on-street parking on Laguna Street or converting Laguna Street to one-way northbound operation between Fell and Fulton Streets, or removing five on-street parking spaces on the east side of Laguna Street between Birch and Fulton Streets to provide a right turn only lane from northbound Laguna Street onto eastbound Fulton Street.

Alternative 5: Operational Improvements to Webster Street North of Oak Street -

This alternative seeks to divert north-south traffic to Webster Street, which is currently underutilized despite being designed as a broad boulevard between Ivy and Bush Streets. Operational improvements considered for Webster Street include widening the roadway between Oak and Ivy Streets through either sidewalk narrowing or on-street parking removals, signalizing the four-way STOP controlled intersections of Webster/Grove and Webster/O'Farrell, and improving signal timing along Webster Street. This alternative is shown on Figure 10.

Evaluation Criteria

Each of the alternatives described above are evaluated in this section. The evaluation criteria, consistent with the criteria described in Chapter 1, include:

- Traffic Circulation Impacts;
- Urban Design Impacts;
- Neighborhood Cohesion Impacts;
- Reclamation of Freeway Land;
- Impacts on Other Transportation Modes;
- Environmental Impacts; and
- Costs.

Additionally, construction issues related to the physical feasibility of designing and constructing each alternative are described in general terms for each alternative prior to the discussion of project impacts. More detailed engineering studies would need to be conducted if any of these alternatives are selected for implementation. An estimate of the construction cost of each alternative is provided at the end of the discussion of each

FIGURE 9

Alternative 4: Improvements to Laguna Street

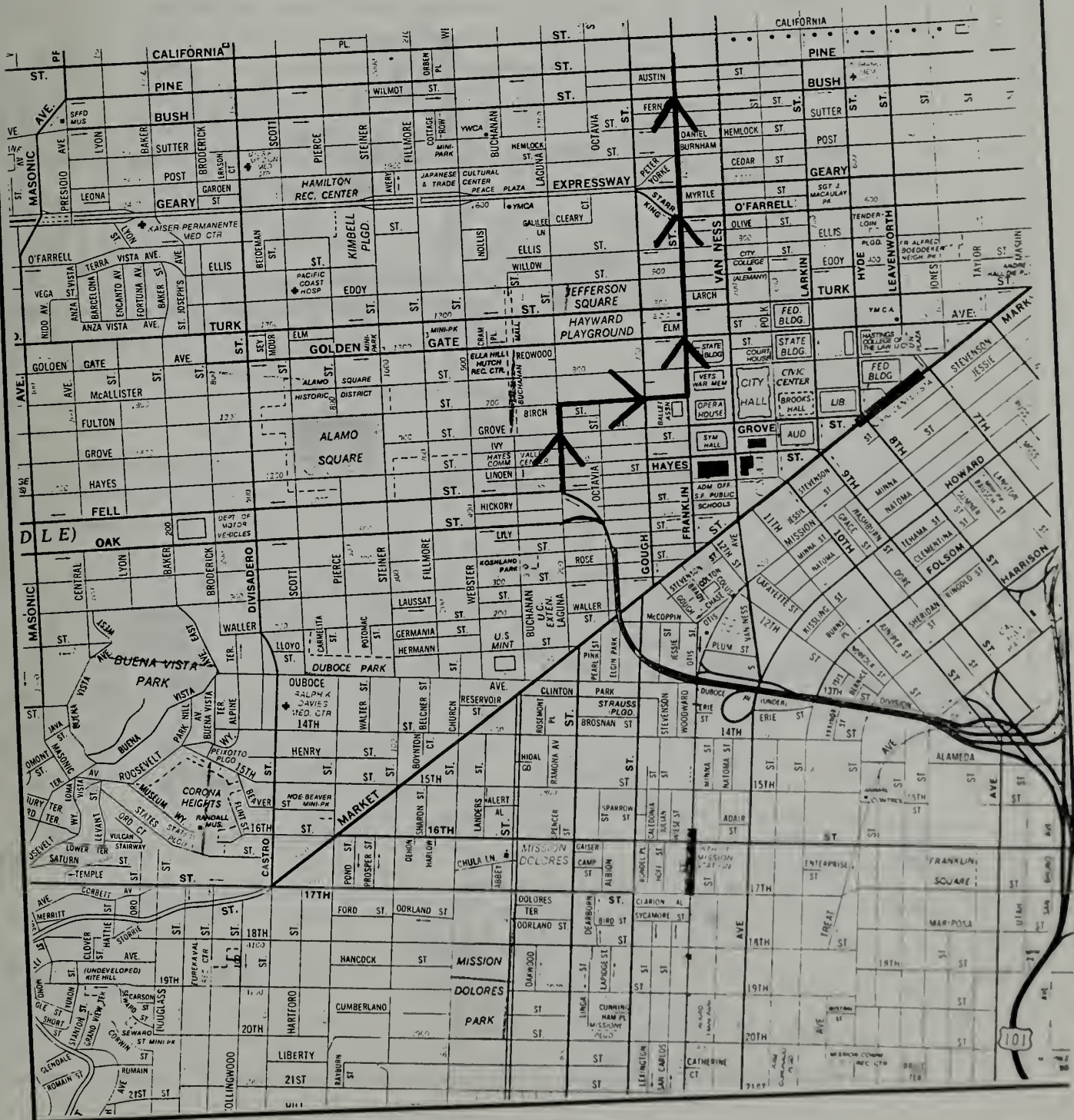
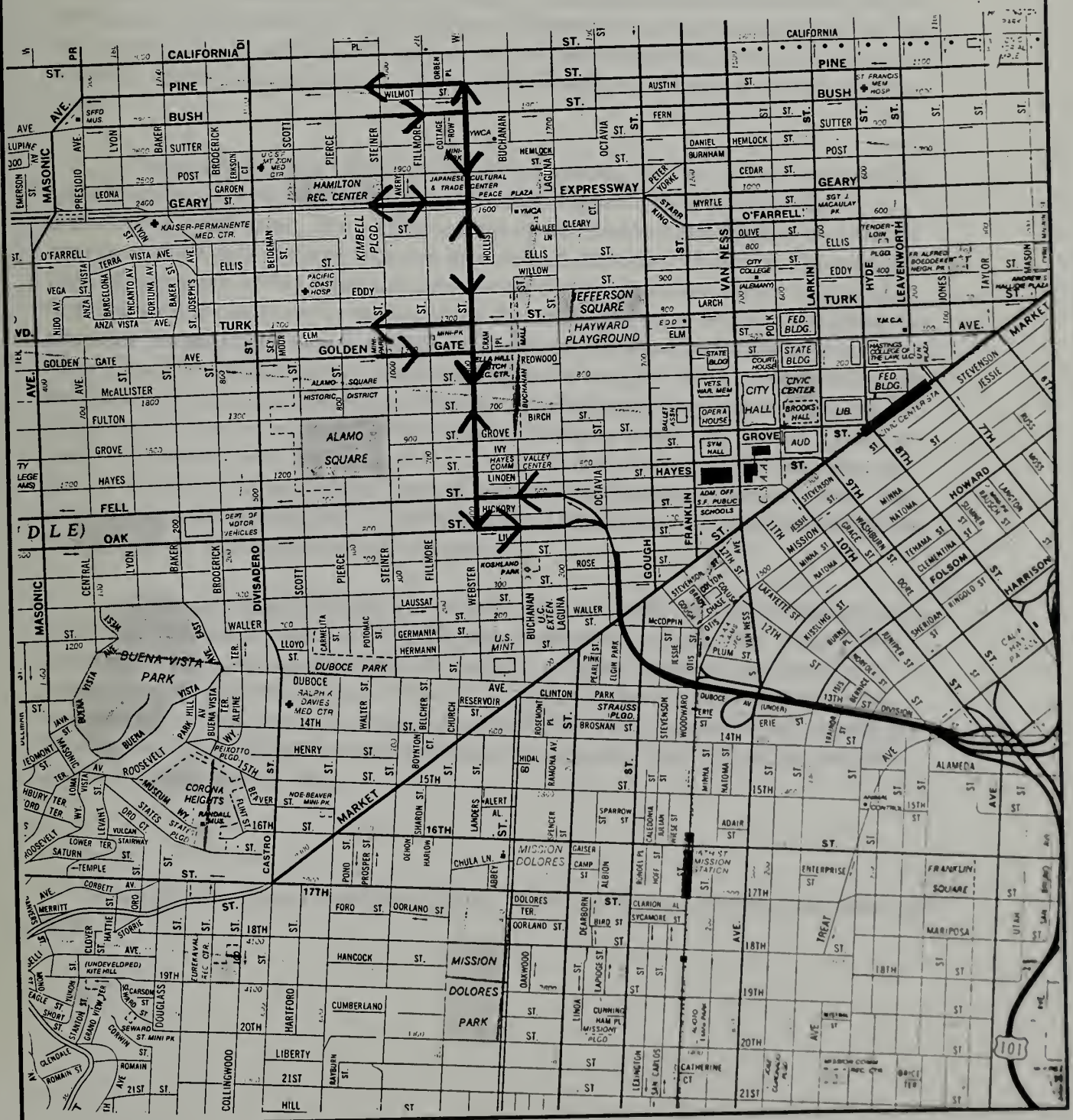


FIGURE 10

Alternative 5: Improvements to Webster Street



alternative. These costs are in addition to the costs required to rebuild the freeway to Oak and Fell Streets as mandated by Proposition H, and would most likely not be eligible for federal emergency relief funding.¹ If approved for implementation, these projects would have to compete with other San Francisco transportation projects for State and Federal funds.

Evaluation of Alternative 1: Rebuilding Franklin-Gough Ramps

The result of this alternative would be a return to the conditions that existed prior to the 1989 Loma Prieta earthquake, as described in Chapter Three, with the exception that both the Franklin-Gough ramps and the portion of the Central Freeway north of Mission Street would be one level, as opposed to being double-decked structures as they were prior to 1989.

Construction Issues - The right-of-way connecting the Central Freeway from the vicinity of Octavia and Oak Streets to the Franklin/Golden Gate and Gough/Turk intersections is still intact. The 110' wide right-of-way north of Fell Street is adequate to provide a single-deck freeway with two lanes in each direction. However, the existing right-of-way south of Fell Street can only accommodate single lane connections to and from the widened structure to remain within the established right-of-way.² Therefore, this alternative assumes that there is one lane of travel in each direction for the entire length of these proposed freeway ramps. Additionally, because the Oak Street on-ramp will be at the same elevation as the Fell Street off-ramp, the southbound on-ramp from Gough Street would have to pass over the Fell Street off-ramp to connect to the Oak Street on-ramp. This would most likely require the construction of an elevated freeway ramp just west of the section of the widened Central Freeway which parallels Octavia Street. The new structure would most likely be directly above Octavia Street. No additional right-of-way appears to be required for this alternative.

Traffic Circulation Impacts - As stated above, the traffic circulation impacts of this alternative would be a return to the traffic conditions which existing prior to the 1989 Loma Prieta earthquake as described in Chapter 3 resulting in more direct freeway connectivity to the northern parts of the city. Traffic volumes on Fell and Oak Streets west of Laguna Street would be expected to decline by 20-30 percent while volumes on Franklin and Gough Streets would increase north of Golden Gate Avenue and decline south of Golden Gate Avenue.

¹Dennis Bosler, Project Manager, Caltrans District 4, letter to Jerry Robbins dated April 16, 1998.

²Ibid

Urban Design Impacts - The rebuilding of the Gough and Franklin ramps would have detrimental visual impacts on the Hayes Valley neighborhood by reimposing the above-ground freeway in the former right-of-way between Fell and Turk Streets. In addition, the high-level connection passing over the Fell Street ramp would impose additional shadows over Octavia Street.

Neighborhood Cohesion Impacts - Rebuilding the Franklin-Gough ramps would reduce traffic volumes on Fell and Oak Streets, but would do so by increasing volumes on Franklin and Gough Streets. All four streets are classified as Major Arterials in the Transportation Element of the San Francisco General Plan, although Fell and Oak Streets are almost entirely residential in nature and Franklin and Gough Streets contain a wider variety of land uses.

Reclamation of Freeway Land - This alternative would leave no freeway right-of-way for alternate uses such as housing, open space or neighborhood serving commercial development.

Impacts on Other Transportation Modes - By maximizing the amount of traffic using above-ground freeways, this alternative might provide modest benefits to public transit operations on city streets. It may also reduce surface street conflicts between traffic and bicycles and pedestrians. More specifically, bicycle traffic using Fell and Oak Streets between Scott Street and the entrance to the Panhandle at Baker Street (an existing gap in the bicycle network between Market Street and Golden Gate Park) may benefit from reduced traffic volumes on Oak and Fell Streets. Pedestrian safety would generally benefit from reduced traffic volumes on surface streets.

Environmental Impacts - Construction of an elevated freeway to the Franklin/Golden Gate and Gough/Turk intersections would negatively impact the area alongside the structure by increasing noise and air pollution. Existing open spaces along the former freeway right-of-way would need to be removed, including those adjacent to numerous small businesses, residences and John Swett School. On the other hand, construction of the roadway would remove some vehicular traffic from Fell and Oak Streets west of Laguna Street, thereby reducing noise and air pollution on these streets.

Construction Cost - Caltrans estimates the cost of this alternative at \$41.6 million, far higher than any of the other alternatives considered in this study. This cost includes \$10 million for the new southbound on-ramp south of Fell Street. The cost estimate includes planning, design and construction engineering costs.

Evaluation of Alternative 2: New Northbound Off-Ramp to Fell Street at Octavia Street

This alternative would provide a new off-ramp from the westbound Central Freeway onto eastbound Fell Street and/or northbound Octavia Street.

Construction Issues - The 80' right-of-way along Octavia Street between Oak and Fell Streets would be adequate to provide a one lane northbound off-ramp. This ramp may require widening of the westbound freeway south of Oak Street in order to provide a three-lane facility upstream of the point where the roadway would separate between the Fell/Laguna ramp and the Fell/Octavia ramp. The major problem with this alternative would be a very steep off-ramp descent between Oak and Fell Streets. Assuming a 16 foot clearance and a five foot thick structure, the proposed off-ramp would be a minimum of 21 feet above Oak Street. Because the elevation of the Fell/Octavia intersection is three feet higher than the elevation of the Oak/Octavia intersection, the total descent between the two intersections would be approximately 18 feet. Achieving this descent within the 300 feet between these two intersections would result in an average downgrade of six percent. However, because some vertical curvature would be needed to develop the descent and to conform to the Fell/Octavia intersection, maximum grades would be as high as eight to ten percent, exceeding the maximum standard for ramps of eight percent. Sight distance for traffic approaching the intersection of Fell/Octavia would be less than the minimum sight distance required to offer a motorist a clear view of the intersection. Additionally, stopping distance on the descending ramp would be longer than for a flatter roadway.³

A variation of this alternative which was considered in 1991 was to curve this off-ramp through the block bounded by Oak, Fell, Octavia and Gough Streets and terminate it at the intersection of Fell and Gough Streets. The approximate 500 foot diagonal length through this block would allow a flatter grade, but would be partially offset by the fact that the elevation of the Fell/Gough intersection is two feet lower than that of the Oak/Octavia intersection. Assuming a five foot thick roadway, the total descent would be 23 feet over an approximate 500 foot distance, for an average grade of just under five percent. This variation requires the acquisition of residential and commercial right-of-way.

It has been suggested that the application of a steel truss structure over Oak Street could decrease the required thickness of the roadway and thereby decrease the steepness of this off-ramp. This type of construction could reduce the roadway thickness from approximately five feet to approximately one to two feet, but would require the construction of additional steel structures three to four feet high above-roadway on both sides of the off-ramp as it passes over Oak Street. By reducing the roadway thickness by

³Dennis Bosler, Project Manager, Caltrans District 4, letter to Jerry Robbins dated April 16, 1998.

four feet, the total descent between Oak/Octavia and Fell/Octavia would be reduced to fourteen feet, yielding an average downgrade of less than five percent, and maximum downgrades of approximately 6-8 percent.

Traffic Circulation Impacts - If a northbound off-ramp were constructed to the intersection of Fell and Octavia Streets, it would likely attract a substantial volume of traffic away from the Fell Street off-ramp as well as from other routes serving the northwest portion of the city. If Fell Street were made two-way between Octavia and Gough Streets, traffic exiting at this off-ramp could turn right onto eastbound Fell Street and go two blocks and turn left onto northbound Franklin Street. The volume of traffic that would be accommodated by this route would be limited by the capacity of the eastbound portion of Fell Street between Octavia and Franklin Streets and by the available traffic capacity on Franklin Street north of Fell Street. Depending on the design of the intersection of the off-ramp with Fell and Octavia Streets, it may be possible for traffic on the off-ramp to travel north onto Octavia Street to Fulton Street, turn right on Fulton Street and make a left turn onto northbound Franklin Street at the "T" intersection of Fulton and Franklin Streets. The peak period capacity of this route would also be limited by the available capacity on northbound Franklin Street. This alternative would not improve traffic conditions for southbound traffic destined for the Oak Street on-ramp.

Urban Design Impacts - This alternative would impose an additional above-ground crossing of Oak Street just east of the point where the Fell Street ramp crosses over Oak Street. While this additional structure would not have any view blocking impacts, it would increase the portion of Oak Street that is shadowed by above-ground structures.

Neighborhood Cohesion Impacts - Providing a new off-ramp to Fell and Octavia Streets would reduce traffic volumes on Fell Street west of Laguna Street, but would increase traffic on Fell Street east of Octavia Street and on northbound Franklin Street. Both streets are classified as Major Arterials in the Transportation Element of the San Francisco General Plan, although Fell Street west of Laguna Street is almost entirely residential in nature while Fell Street east of Octavia Street and Franklin Street contain a wider variety of land uses.

Reclamation of Freeway Land - This alternative would occupy the currently vacant freeway right-of-way between Oak and Fell Streets, but would leave the remaining right-of-way north of Fell Street available for alternate uses such as housing, open space or neighborhood serving commercial development.

Impacts on Other Transportation Modes - By making Fell Street two-way between Octavia and Gough Streets, this alternative may negatively impact Municipal Railway transit operations on routes 16AX and 16BX, which use this block of Fell Street during the PM peak. On the other hand, the proposed northbound off-ramp may attract some

Civic Center-bound traffic away from the Mission Street and 9th Street freeway exits, thereby reducing traffic volumes on Mission Street, Van Ness Avenue and 9th Street, which all carry regular transit service.

The introduction of a freeway off-ramp at the Fell/Octavia intersection may present potential pedestrian safety problems. Traffic turning right from the northbound freeway off-ramp to eastbound Fell Street may necessitate the closure of the southern crosswalk of Fell Street across the proposed off-ramp.

Environmental Impacts - The proposed off-ramp would increase noise and air pollution on Fell Street east of Octavia Street, but would decrease these impacts on Fell Street west of Laguna Street. Since 1991, the parcel at the southwest corner of Fell and Gough Streets has been developed as a multi-family residential building. Acquisition of this property would thus have a severe environmental impact. Converting the block of Oak Street between Octavia and Gough Streets to two-way may require removing on-street parking on one side of this street during peak periods in order to accommodate increased traffic volumes. Sidewalk narrowing on this block is not an option since the sidewalks are currently only ten feet wide.

Construction Cost - Caltrans estimates the cost of this project at is \$5.2 million, including planning, design and construction management costs.

Evaluation of Alternative 3: New Southbound On-Ramp From Octavia Street

Construction Issues - There are no known engineering problems associated with this alternative.

Traffic Circulation - These alternatives (shown on Figures 7 and 8) would slightly improve access to the Oak Street on-ramp by eliminating the need for traffic from the north to pass through the congested intersection of Fell and Laguna Streets. This would help to reduce the conflict between traffic which exits the freeway at this intersection onto westbound Fell Street and traffic on westbound Fell Street which makes a left turn onto southbound Laguna Street in order to reach the Oak Street on-ramp. Other than avoiding the moderate delays on the Fell Street approach to the Fell/Laguna intersection, this alternative would not be significantly more attractive to southbound motorists than the previous route, and would have only minor traffic circulation benefits. Under this alternative, left turns from westbound Fell Street and from the Fell Street on-ramp onto westbound Laguna Street would be prohibited. This may negatively impact northbound Central Freeway traffic access, as the movement from the Fell Street off-ramp to westbound Laguna Street to eastbound Oak Street to northbound Franklin Street would no longer be possible.

The variation of this alternative which makes Oak Street two-way between Gough and Octavia Streets would increase overall traffic volumes on this block of Oak Street, while reducing traffic volumes on westbound Fell Street between Gough and Laguna Streets. Depending on how the entrance to the Oak Street on-ramp is designed, this alternative could have the beneficial impact of discouraging use of Hickory Street between Buchanan Street and Laguna Street as an access route to the Oak Street on-ramp. Use of this route as a "short cut" to the Oak Street on-ramp was a common complaint of Hickory Street residents prior to the closure of the Oak Street on-ramp.

Urban Design Impacts - This alternative would alter the appearance of the existing Caltrans-owned open space between Oak, Fell, Octavia and Laguna Streets, possibly removing some trees.

Neighborhood Cohesion Impacts - This alternative would not have any substantial impacts on neighborhood cohesion compared to either 1996 or 1998 conditions.

Reclamation of Freeway Land - This alternative would occupy some of the currently vacant Caltrans-owned land on the block bordered by Oak, Fell, Octavia and Laguna Streets. With the rebuilding of the Oak and Fell freeway ramps on this block mandated by Proposition H, this area would be difficult to develop for other uses.

Impacts on Other Transportation Modes - Making Oak Street two-way between Octavia and Gough Streets may negatively impact Municipal Railway transit operations on routes 16AX and 16BX, which use this block of Oak Street during the AM peak period. This alternative would not have any significant impact on bicycle or pedestrian safety compared to either 1996 or 1998 conditions.

Environmental Impacts - The proposed off-ramp would have little noticeable impact on noise levels or air quality and would not impact open spaces or public safety.

Construction Cost - The cost of a new roadway connecting Octavia and Laguna Streets between Oak and Fell Streets is estimated roughly at \$1 million.

Evaluation of Alternative 4: Operational Improvements to Laguna Street North of Fell Street

Construction Issues - There are no known engineering difficulties related to the construction of this alternative.

Traffic Circulation Impacts - Traffic capacity on northbound Laguna Street north of Fell Street is currently limited by the capacity of the intersections of Laguna/Hayes and Laguna/Grove, both of which are controlled by four-way STOP signs. Improving the

capacity of these intersections would divert some traffic that currently uses westbound Fell Street to alternate routes including northbound Laguna Street to eastbound Fulton Street to northbound Franklin Street, and perhaps to northbound Laguna Street to westbound Turk Street. The existing peak period northbound capacity of Laguna Street at Hayes Street is estimated at approximately 400-500 vehicles per hour per lane. If this intersection were signalized, the northbound capacity could be increased to approximately 600-700 vehicles per hour. If an additional northbound lane could be provided as well, the northbound capacity could be increased to approximately 1,200-1,400 vehicles per hour. Any shift in traffic to northbound Laguna Street would result in decreased traffic on westbound Fell Street and some decrease in the volume of traffic which uses the 9th Street and Mission Street freeway exits to reach the Civic Center and Western Addition areas and to access northbound Franklin Street. As with the previous alternatives, the capacity of this alternative would largely be limited by the peak period capacity available on northbound Franklin Street north of Fulton Street. Traffic using the northbound-Laguna Street-to-westbound-Turk Street route would not be subject to this limitation.

Urban Design Impacts - This alternative would not introduce any new overhead structures. Urban design impacts include possible narrowing of sidewalks from fifteen feet to nine feet on each side of Laguna Street and removal of some street trees. Tree removals require Department of Public Works public hearings and are often controversial.

Neighborhood Cohesion Impacts - This alternative would help to disperse westbound Central Freeway traffic onto a variety of streets, as opposed to concentrating this traffic on westbound Fell Street. However, the impacts would still be borne by the same general neighborhood, and traffic volumes would increase on Laguna Street, which is not currently classified as an arterial.

Reclamation of Freeway Land - This alternative would allow the former Central Freeway right-of-way between Fell Street and Turk Street to be reclaimed for other uses.

Impacts on Other Transportation Modes - Signalizing the intersection of Laguna/Hayes may help to decrease delays to Municipal Railway route 21-HAYES by increasing the capacity of this intersection. On the other hand, inbound 21-HAYES buses use northbound Laguna Street between Hayes and Grove Streets, and may be negatively impacted by increased traffic on northbound Laguna Street. Turk Street is a signed bicycle route west of Laguna Street, and increased vehicular traffic on this street could negatively impact bicyclists. Increased traffic and the removal of on-street parking on Laguna Street could have a negative impact on pedestrian safety. On the other hand, reduced traffic on westbound Fell Street between Scott and Baker Streets could improve conditions for bicyclists on this street, as described under Alternative 1.

Environmental Impacts - Land uses on the two block section of Laguna Street between Fell and Fulton Street include residential, commercial and industrial uses.

Increased traffic on this street may negatively impact residential uses. Sidewalk narrowing or on-street parking removals on these blocks could negatively impact the noise and air pollution impacts of traffic by bringing the traffic closer to the buildings. Sidewalk narrowing and on-street parking removals would also have a negative impact on nearby businesses and on pedestrian comfort by bringing vehicular traffic and foot traffic closer together.

Construction Cost - The cost of this alternative is estimated at \$0.3 million for new traffic signals and interconnecting them to adjacent signals, plus \$0.5 million for the sidewalk narrowing option. The cost for the parking removal or one-way operation of Laguna Street measures are nominal. Therefore, the total project costs would range from \$0.3 - 0.8 million.

Evaluation of Alternative 5: Operational Improvements to Webster Street North of Oak Street

Construction Issues - There are no known engineering difficulties associated with the construction of this alternative. Previous proposals to widen the entire right-of-way of Webster Street between Hayes and Ivy Streets were found to be infeasible because of the need to remove or relocate historic buildings on the east side of Webster Street.

Traffic Circulation Impacts - This alternative would improve north-south access to and from the Central Freeway without increasing traffic demands on Franklin and Gough Streets, but only during off-peak hours. During peak periods, traffic exiting the Central Freeway destined for Webster Street would still need to pass through the congested two blocks of Fell Street between Laguna and Webster Streets, which operate at capacity. Since no new capacity would be created on these two blocks, this alternative would have little benefit for peak period Central Freeway traffic. Increased use of Webster Street could relieve existing traffic congestion along other north-south routes including Franklin Street, Gough Street, Divisadero Street, Masonic Avenue and Stanyan Street.

Signalizing the existing four-way STOP controlled intersection of Webster/Grove Streets could increase the capacity of Webster Street by 200-300 vehicles per hour in both the northbound and southbound directions. Providing a second northbound or southbound lane along Webster Street between Oak and Ivy Streets could double the traffic capacity of this street. An improved Webster Street may be attractive to motorists on Fell Street who are bound for the Richmond District. These motorists could turn right from westbound Fell Street onto northbound Webster Street, then turn left at either Turk Street, Geary Boulevard or Pine Street to proceed westward. The reverse trip would be somewhat less attractive, since southbound motorists on Webster Street could be delayed in crossing Fell Street and turning left onto eastbound Oak Street by long traffic signal cycles at these intersections which provide most of their green time to Oak and Fell

Streets. Nevertheless, improvement of this route may decrease the demand for similar movements from southbound Stanyan Street, Masonic Avenue and Divisadero Street.

Urban Design Impacts - This alternative would not introduce any new overhead structures. Urban design impacts include possible narrowing of sidewalks from fifteen feet to nine feet on each side of Webster Street and removal of some street trees.

Neighborhood Cohesion Impacts - This alternative would help to disperse westbound Central Freeway traffic onto a variety of streets, as opposed to concentrating this traffic on westbound Fell Street. However, traffic volumes would increase on Webster Street between Oak and Pine Streets. Webster Street is not currently classified as an arterial street in the city's General Plan.

Reclamation of Freeway Land - This alternative would allow the former Central Freeway right-of-way between Fell Street and Turk Street to be reclaimed for other uses.

Impacts on Other Transportation Modes - Turk Street is a signed bicycle route west of Laguna Street, and increased vehicular traffic on this street could negatively impact bicyclists. On the other hand, reduced traffic on westbound Fell Street between Scott and Baker Streets could improve conditions for bicyclists on this street, as described under Alternative 1. There are striped bicycle lanes on Webster Street between Ivy and Bush Streets. Bicycle circulation may be impacted somewhat by increased traffic volumes on Webster Street. Increased traffic and sidewalk narrowing on Webster Street could negatively impact pedestrian circulation and safety on that street.

Environmental Impacts - Land uses on the two and one-half blocks of Webster Street between Oak and Ivy Streets are primarily residential. Increased traffic on this street may negatively impact residential uses. Sidewalk narrowing and/or on-street parking removals on these blocks could negatively impact the noise and air pollution impacts of traffic by bringing the traffic closer to the buildings. Sidewalk narrowing and on-street parking removals would also have a negative impact on pedestrian comfort by bringing vehicular traffic and foot traffic closer together. The section of Webster Street north of Ivy Street is somewhat less sensitive to increased traffic volumes than the section south of Ivy Street because it is less dominated by residential land uses, the street is wider and there is a twenty foot-wide landscaped median.

Construction Cost - The cost of narrowing the sidewalks of Webster Street between Oak and Ivy Streets is estimated by the Department of Public Works at \$0.7 million including planning, design and construction engineering costs. The cost of installing two new traffic signals and interconnecting them to other signals along the Webster Street corridor is estimated at \$0.3 million, for a total project cost of \$1.0 million.

CHAPTER 6

FINDINGS AND RECOMMENDATIONS

This chapter summarizes the findings and recommendations of the Central Freeway North-South Access Study.

Key Findings

Key findings of this study regarding the changes in traffic circulation within the study area between 1989 and the present are summarized below:

- The removal of the Franklin-Gough ramps following the 1989 Loma Prieta earthquake caused a shift in traffic to a variety of city streets. Traffic volume increases range from two percent to 67 percent on city streets influenced by this change;
- The traffic increases on Fell and Oak Streets west of Laguna Street after the closure of the Franklin-Gough ramps were 20 percent and 30 percent, respectively. These increases accounted for approximately 21 percent of the traffic that previously used the Franklin-Gough ramps. The remaining 79 percent of the traffic that previously used the Franklin-Gough ramps was dispersed to a variety of city streets;
- Despite the closure of the Franklin-Gough ramps, traffic on northbound Franklin Street actually increased by eight percent following the earthquake, indicating that drivers wishing to use Franklin Street were willing to take any available route that would get them to this street despite surface street congestion;
- A variety of traffic improvements made on city streets and on the freeway system prior to the 1996 closure of the Central Freeway has enhanced traffic flow along several alternative north-south routes.

Key findings regarding the feasibility of possible north-south access alternatives to the Central Freeway include:

- Spatial and topographical constraints in the vicinity of the current terminus of the Central Freeway hinder the feasibility of providing improved access from the freeway to the north and south; and
- The single-deck construction of the Central Freeway to Fell and Oak Streets as required in Proposition H makes providing connections to north-south roadways more difficult than if the Central Freeway were a double-deck structure.

Table 6
ALTERNATIVES EVALUATION MATRIX

Evaluation Criterion	1. Rebuild Franklin-Gough Ramps	2. New Off-Ramp to Fell/Octavia	3. New On-Ramp From Octavia St.	4. Laguna St. Operational Changes	5. Webster St. Operational Changes
Traffic Circulation	++	+	+	+	=
Urban Design	--	-	-	-	-
Neighborhood Cohesion	-	=	=	-	=
Reclaimed Freeway Land	--	-	-	=	=
Impacts on Other Modes	+	=	-	-	-
Environmental Impacts	-	=	=	-	-
Estimated Costs (millions)	\$ 41.6	\$ 5.2	\$ 1	\$ 0.3-0.8	\$ 1

KEY

- ++ Major Positive Impact
- + Minor Positive Impact
- = No Impact
- Minor Negative Impact
- Major Negative Impact

A summary matrix of the five alternatives evaluated in this study is shown on Table 6. Each alternative has both positive and negative impacts. This matrix indicates that each of the alternatives has both positive and negative impacts. All the alternatives provide some level of traffic relief to portions of Oak and Fell Streets, yet would create traffic increases on other city streets.

Recommendations

Alternative 1 (Reconstruction of the Franklin-Gough Ramps), is clearly not recommended because of its high cost and negative impacts on residences and businesses north of Fell Street between Octavia and Franklin Streets. Other alternatives have less extensive costs and impacts but are also much less successful in improving north-south access through the Central Freeway corridor. A variation of Alternative 4 (Operational Improvements to Laguna Street) which provides traffic signal improvements along Laguna Street but does not narrow the sidewalks or remove any trees is recommended as a means to improve northbound Central Freeway access with minimal negative impacts. In view of the significant volume of Central Freeway traffic that has been dispersed to a variety of South of Market and Civic Center surface streets as a result of the closure of the Franklin and Gough ramps and the surface street improvements made since 1996, this may be the only action needed to provide reasonably adequate north-south Central Freeway access.

APPENDIX A

TEXT OF PROPOSITION H

TEXT OF PROPOSED ORDINANCE

PROPOSITION H

Be it Ordained by the People of the City and County of San Francisco:

CENTRAL FREEWAY REPLACEMENT PROJECT ACT OF 1997

SECTION 1. Title

This Ordinance shall be known and may be cited as the San Francisco Central Freeway Replacement Project Act of 1997.

SECTION 2. Findings and Declarations

The people of the City and County of San Francisco hereby find and declare all of the following:

(a) Since the closure of the Central Freeway in 1989 as a result of the devastating Loma Prieta Earthquake, there has been a dramatic negative effect upon neighborhood residents and businesses in San Francisco.

(b) Closure of the Central Freeway has caused South of Market and Civic Center neighborhoods to choke in traffic and pollution caused by alternative surface road routes.

(c) Many merchants and businesses have suffered a tremendous loss of business or had to close because of the shut down of the Central Freeway.

(d) California state law provides that the California Department of Transportation may proceed with the repair or replacement of the Central Freeway once an alternative is approved by the City and County of San Francisco.

(e) The Central Freeway Replacement Project alternative provided for by this Ordinance is the best way to relieve the traffic and pollution caused by the closure of the Central Freeway and to permit merchants and

businesses in the City to serve the needs of the citizens of San Francisco.

(f) The Central Freeway Replacement Project alternative provided for by this Ordinance is the most reasonable and practical alternative for repairing the Central Freeway.

SECTION 3. Purpose and Intent

The people of the City and County of San Francisco hereby declare their purpose and intent in enacting the measure to be as follows:

(a) To reopen the Central Freeway to eliminate the traffic congestion and pollution caused by its closure.

(b) To allow neighborhood residents the ability to enjoy the quality of life they experienced prior to the Loma Prieta Earthquake of 1989.

(c) To allow businesses and merchants the opportunity to serve the public without disruption.

(d) To give direction to the California Department of Transportation as to the alternative that has been approved by the City and County of San Francisco so that the Department of Transportation may proceed with the repair of the Central Freeway.

(e) To place into law an ordinance which approves the most reasonable and practical alternative for the Central Freeway Replacement Project.

SECTION 4. Repeal of Resolution No. 541-92

Resolution No. 541-92, approved by the Board of Supervisors of the City and County of San Francisco, is hereby repealed.

SECTION 5. Central Freeway Replacement

Project

(a) The people of the City and County of San Francisco hereby approve the Central Freeway Replacement Project alternative as described in this section.

(b) The existing lower deck of the Central Freeway shall be retrofitted and widened, providing a four lane single deck structure from Mission Street to Oak and Fell Streets.

(c) The portion of the Central Freeway structure from the intersection of Page and Octavia Streets to the Fell Street ramp shall be replaced rather than retrofitted. A new on-ramp from Oak Street to Market Street shall be built to replace the demolished Oak Street on-ramp.

(d) The City and County of San Francisco shall work together with the California Department of Transportation to develop a plan to resolve the lack of northern accessibility to the Central Freeway that was previously provided by the Franklin/Gough Street ramps. The plan shall be completed by July 1, 1998.

(e) The existing Central Freeway shall remain open and shall only be closed temporarily for the shortest duration possible for construction purposes only.

SECTION 6. Severability

If any provision of this Act or the application thereof to any person or circumstances is held invalid or unconstitutional, such invalidity or unconstitutionality shall not affect other provisions or applications of this initiative which can be given effect without the invalid or unconstitutional provision or application, and to this end the provisions of this initiative are severable.

